

2003B133  
Office Action of 6/8/06  
Response dated 10/6/06

**IN THE CLAIMS:**

1. (Original) A polymerization process comprising contacting one or more monomer(s), one or more Lewis acid(s), one or more initiator(s), and a diluent comprising one or more hydrofluorocarbon(s) (HFC's) in a reactor.
2. (Original) The process of claim 1, wherein one or more hydrofluorocarbon(s) is represented by the formula:  $C_xH_yF_z$  wherein x is an integer from 1 to 40 and y and z are integers of one or more.
3. (Original) The process of claim 2, wherein x is from 1 to 10.
4. (Original) The process of claim 2, wherein x is from 1 to 6.
5. (Original) The process of claim 2, wherein x is from 1 to 3.
6. (Original) The process of claim 1, wherein the one or more hydrofluorocarbon(s) is independently selected from the group consisting of fluoromethane; difluoromethane; trifluoromethane; fluoroethane; 1,1-difluoroethane; 1,2-difluoroethane; 1,1,1-trifluoroethane; 1,1,2-trifluoroethane; 1,1,1,2-tetrafluoroethane; 1,1,2,2-tetrafluoroethane; 1,1,1,2,2-pentafluoroethane; 1-fluoropropane; 2-fluoropropane; 1,1-difluoropropane; 1,2-difluoropropane; 1,3-difluoropropane; 2,2-difluoropropane; 1,1,1-trifluoropropane; 1,1,2-trifluoropropane; 1,1,3-trifluoropropane; 1,2,2-trifluoropropane; 1,2,3-trifluoropropane; 1,1,1,2-tetrafluoropropane; 1,1,1,3-tetrafluoropropane; 1,1,2,2-tetrafluoropropane; 1,1,2,3-tetrafluoropropane; 1,1,3,3-tetrafluoropropane; 1,2,2,3-tetrafluoropropane; 1,1,1,2,2-pentafluoropropane; 1,1,1,2,3-pentafluoropropane; 1,1,1,3,3-pentafluoropropane; 1,1,2,2,3-pentafluoropropane; 1,1,2,3,3-pentafluoropropane; 1,1,1,2,2,3-hexafluoropropane; 1,1,1,2,3,3-hexafluoropropane; 1,1,1,3,3,3-hexafluoropropane; 1,1,1,2,2,3,3-heptafluoropropane; 1,1,1,2,3,3,3-heptafluoropropane; 1-fluorobutane; 2-fluorobutane; 1,1-difluorobutane; 1,2-difluorobutane; 1,3-difluorobutane; 1,4-difluorobutane; 2,2-difluorobutane; 2,3-difluorobutane; 1,1,1-trifluorobutane; 1,1,2-

Page 3 of 32

K:\BPC\LA\W\Prosecution\EMCC Prosecution\2003\2003B133\US\2003B133-US Amdt Response 6 Oct 2006.doc

BEST AVAILABLE COPY

2003B133

Office Action of 6/8/06

Response dated 10/6/06

trifluorobutane; 1,1,3-trifluorobutane; 1,1,4-trifluorobutane; 1,2,2-trifluorobutane;  
1,2,3-trifluorobutane; 1,3,3-trifluorobutane; 2,2,3-trifluorobutane; 1,1,1,2-  
tetrafluorobutane; 1,1,1,3-tetrafluorobutane; 1,1,1,4-tetrafluorobutane; 1,1,2,2-  
tetrafluorobutane; 1,1,2,3-tetrafluorobutane; 1,1,2,4-tetrafluorobutane; 1,1,3,3-  
tetrafluorobutane; 1,1,3,4-tetrafluorobutane; 1,1,4,4-tetrafluorobutane; 1,2,2,3-  
tetrafluorobutane; 1,2,2,4-tetrafluorobutane; 1,2,3,3-tetrafluorobutane; 1,2,3,4-  
tetrafluorobutane; 2,2,3,3-tetrafluorobutane; 1,1,1,2,2-pentafluorobutane; 1,1,1,2,3-  
pentafluorobutane; 1,1,1,2,4-pentafluorobutane; 1,1,1,3,3-pentafluorobutane;  
1,1,1,3,4-pentafluorobutane; 1,1,1,4,4-pentafluorobutane; 1,1,2,2,3-  
pentafluorobutane; 1,1,2,2,4-pentafluorobutane; 1,1,2,3,3-pentafluorobutane;  
1,1,2,4,4-pentafluorobutane; 1,1,3,3,4-pentafluorobutane; 1,2,2,3,3-  
pentafluorobutane; 1,2,2,3,4-pentafluorobutane; 1,1,1,2,2,3-hexafluorobutane;  
1,1,1,2,2,4-hexafluorobutane; 1,1,1,2,3,3-hexafluorobutane; 1,1,1,2,3,4-  
hexafluorobutane; 1,1,1,2,4,4-hexafluorobutane; 1,1,1,3,3,4-hexafluorobutane;  
1,1,1,3,4,4-hexafluorobutane; 1,1,1,4,4,4-hexafluorobutane; 1,1,2,2,3,3-  
hexafluorobutane; 1,1,2,2,3,4-hexafluorobutane; 1,1,2,2,4,4-hexafluorobutane;  
1,1,2,3,3,4-hexafluorobutane; 1,1,2,3,4,4-hexafluorobutane; 1,2,2,3,3,4-  
hexafluorobutane; 1,1,1,2,2,3,3-heptafluorobutane; 1,1,1,2,2,4,4-heptafluorobutane;  
1,1,1,2,2,3,4-heptafluorobutane; 1,1,1,2,3,3,4-heptafluorobutane; 1,1,1,2,3,4,4-  
heptafluorobutane; 1,1,1,2,4,4,4-heptafluorobutane; 1,1,1,3,3,4,4-heptafluorobutane;  
1,1,1,2,2,3,3,4-octafluorobutane; 1,1,1,2,2,3,4,4-octafluorobutane; 1,1,1,2,3,3,4,4-  
octafluorobutane; 1,1,1,2,2,4,4,4-octafluorobutane; 1,1,1,2,3,4,4,4-octafluorobutane;  
1,1,1,2,2,3,3,4,4-nonafluorobutane; 1,1,1,2,2,3,4,4,4-nonafluorobutane; 1-fluoro-2-  
methylpropane; 1,1-difluoro-2-methylpropane; 1,3-difluoro-2-methylpropane; 1,1,1-  
trifluoro-2-methylpropane; 1,1,3-trifluoro-2-methylpropane; 1,3-difluoro-2-  
(fluoromethyl)propane; 1,1,1,3-tetrafluoro-2-methylpropane; 1,1,3,3-tetrafluoro-2-  
methylpropane; 1,1,3-trifluoro-2-(fluoromethyl)propane; 1,1,1,3,3-pentafluoro-2-  
methylpropane; 1,1,3,3-tetrafluoro-2-(fluoromethyl)propane; 1,1,1,3-tetrafluoro-2-  
(fluoromethyl)propane; fluorocyclobutane; 1,1-difluorocyclobutane; 1,2-  
difluorocyclobutane; 1,3-difluorocyclobutane; 1,1,2-trifluorocyclobutane; 1,1,3-  
trifluorocyclobutane; 1,2,3-trifluorocyclobutane; 1,1,2,2-tetrafluorocyclobutane;  
1,1,3,3-tetrafluorocyclobutane; 1,1,2,2,3-pentafluorocyclobutane; 1,1,2,3,3-  
pentafluorocyclobutane; 1,1,2,2,3,3-hexafluorocyclobutane; 1,1,2,2,3,4-

2003B133

Office Action of 6/8/06

Response dated 10/6/06

hexafluorocyclobutane; 1,1,2,3,3,4-hexafluorocyclobutane; 1,1,2,2,3,3,4-heptafluorocyclobutane; vinyl fluoride; 1,1-difluoroethene; 1,2-difluoroethene; 1,1,2-trifluoroethene; 1-fluoropropene; 1,1-difluoropropene; 1,2-difluoropropene; 1,3-difluoropropene; 2,3-difluoropropene; 3,3-difluoropropene; 1,1,2-trifluoropropene; 1,1,3-trifluoropropene; 1,2,3-trifluoropropene; 1,3,3-trifluoropropene; 2,3,3-trifluoropropene; 3,3,3-trifluoropropene; 1-fluoro-1-butene; 2-fluoro-1-butene; 3-fluoro-1-butene; 4-fluoro-1-butene; 1,1-difluoro-1-butene; 1,2-difluoro-1-butene; 1,3-difluoropropene; 1,4-difluoro-1-butene; 2,3-difluoro-1-butene; 2,4-difluoro-1-butene; 3,3-difluoro-1-butene; 3,4-difluoro-1-butene; 4,4-difluoro-1-butene; 1,1,2-trifluoro-1-butene; 1,1,3-trifluoro-1-butene; 1,1,4-trifluoro-1-butene; 1,2,3-trifluoro-1-butene; 1,2,4-trifluoro-1-butene; 1,3,3-trifluoro-1-butene; 1,3,4-trifluoro-1-butene; 1,4,4-trifluoro-1-butene; 2,3,3-trifluoro-1-butene; 2,3,4-trifluoro-1-butene; 2,4,4-trifluoro-1-butene; 3,3,4-trifluoro-1-butene; 3,4,4-trifluoro-1-butene; 4,4,4-trifluoro-1-butene; 1,1,2,3-tetrafluoro-1-butene; 1,1,2,4-tetrafluoro-1-butene; 1,1,3,3-tetrafluoro-1-butene; 1,1,3,4-tetrafluoro-1-butene; 1,1,4,4-tetrafluoro-1-butene; 1,2,3,3-tetrafluoro-1-butene; 1,2,3,4-tetrafluoro-1-butene; 1,2,4,4-tetrafluoro-1-butene; 1,3,3,4-tetrafluoro-1-butene; 1,3,4,4-tetrafluoro-1-butene; 1,4,4,4-tetrafluoro-1-butene; 2,3,3,4-tetrafluoro-1-butene; 2,3,4,4-tetrafluoro-1-butene; 2,4,4,4-tetrafluoro-1-butene; 3,3,4,4-tetrafluoro-1-butene; 3,4,4,4-tetrafluoro-1-butene; 1,1,2,3,3-pentafluoro-1-butene; 1,1,2,3,4-pentafluoro-1-butene; 1,1,2,4,4-pentafluoro-1-butene; 1,1,3,3,4-pentafluoro-1-butene; 1,1,3,4,4-pentafluoro-1-butene; 1,1,4,4,4-pentafluoro-1-butene; 1,2,3,3,4-pentafluoro-1-butene; 1,2,3,4,4-pentafluoro-1-butene; 1,2,4,4,4-pentafluoro-1-butene; 2,3,3,4,4-pentafluoro-1-butene; 2,3,4,4,4-pentafluoro-1-butene; 3,3,4,4,4-pentafluoro-1-butene; 1,1,2,3,3,4-hexafluoro-1-butene; 1,1,2,3,4,4-hexafluoro-1-butene; 1,1,2,4,4,4-hexafluoro-1-butene; 1,2,3,3,4,4-hexafluoro-1-butene; 1,2,3,4,4,4-hexafluoro-1-butene; 2,3,3,4,4,4-hexafluoro-1-butene; 1,1,2,3,3,4,4-heptafluoro-1-butene; 1,1,2,3,4,4,4-heptafluoro-1-butene; 1,1,3,3,4,4,4-heptafluoro-1-butene; 1,2,3,3,4,4,4-heptafluoro-1-butene; 1-fluoro-2-butene; 2-fluoro-2-butene; 1,1-difluoro-2-butene; 1,2-difluoro-2-butene; 1,3-difluoro-2-butene; 1,4-difluoro-2-butene; 2,3-difluoro-2-butene; 1,1,1-trifluoro-2-butene; 1,1,2-trifluoro-2-butene; 1,1,3-trifluoro-2-butene; 1,1,4-trifluoro-2-butene; 1,2,3-trifluoro-2-butene; 1,2,4-trifluoro-2-butene; 1,1,1,2-tetrafluoro-2-butene; 1,1,1,3-tetrafluoro-2-butene; 1,1,1,4-tetrafluoro-2-butene; 1,1,2,3-tetrafluoro-2-butene; 1,1,2,4-tetrafluoro-2-

2003B133

Office Action of 6/8/06

Response dated 10/6/06

butene; 1,2,3,4-tetrafluoro-2-butene; 1,1,1,2,3-pentafluoro-2-butene; 1,1,1,2,4-pentafluoro-2-butene; 1,1,1,3,4-pentafluoro-2-butene; 1,1,1,4,4-pentafluoro-2-butene; 1,1,2,3,4-pentafluoro-2-butene; 1,1,2,4,4-pentafluoro-2-butene; 1,1,1,2,3,4-hexafluoro-2-butene; 1,1,1,2,4,4-hexafluoro-2-butene; 1,1,1,3,4,4-hexafluoro-2-butene; 1,1,1,4,4,4-hexafluoro-2-butene; 1,1,2,3,4,4-hexafluoro-2-butene; 1,1,1,2,3,4,4-heptafluoro-2-butene; 1,1,1,2,4,4,4-heptafluoro-2-butene; and mixtures thereof.

7. (Original) The process of claim 1, wherein the one or more hydrofluorocarbon(s) is independently selected from the group consisting of fluoromethane, difluoromethane, trifluoromethane, 1,1-difluoroethane, 1,1,1-trifluoroethane, 1,1,1,2-tetrafluoroethane, and mixtures thereof.
8. (Previously presented) The process of claim 1, wherein the diluent comprises from 15 to 100 volume % HFC based upon the total volume of the diluent.
9. (Original) The process of claim 8, wherein the diluent comprises from 20 to 100 volume % HFC based upon the total volume of the diluent.
10. (Original) The process of claim 9, wherein the diluent comprises from 25 to 100 volume % HFC based upon the total volume of the diluent.
11. (Previously presented) The process of claim 1, wherein the diluent further comprises a hydrocarbon, a non-reactive olefin, and/or an inert gas.
12. (Currently amended) The process of claim 1, wherein the diluent further comprises claim 11, wherein the hydrocarbon is a halogenated hydrocarbon other than an HFC.
13. (Currently amended) The process of ~~claim 12, wherein the halogenated hydrocarbon is claim 1, wherein the diluent further comprises methyl chloride.~~
14. (Previously presented) The process of claim 1, wherein the one or more Lewis acid(s) is represented by the formula  $MX_4$ ;

2003B133  
Office Action of 6/8/06  
Response dated 10/6/06

wherein M is a Group 4, 5, or 14 metal; and  
each X is a halogen.

15. (Previously presented) The process of claim 1, wherein the one or more Lewis acid(s) is represented by the formula  $MR_nX_{4-n}$ ;  
wherein M is Group 4, 5, or 14 metal;  
each R is a monovalent  $C_1$  to  $C_{12}$  hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;  
 $n$  is an integer from 0 to 4; and  
each X is a halogen.
16. (Previously presented) The process of claim 1, wherein the one or more Lewis acid(s) is represented by the formula  $M(RO)_nR'_mX_{4-(m+n)}$ ;  
wherein M is Group 4, 5, or 14 metal;  
each RO is a monovalent  $C_1$  to  $C_{30}$  hydrocarboxy radical independently selected from the group consisting of an alkoxy, aryloxy, arylalkoxy, alkylaryloxy radicals;  
each R' is a monovalent  $C_1$  to  $C_{12}$  hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;  
 $n$  is an integer from 0 to 4;  
 $m$  is an integer from 0 to 4, wherein the sum of  $n$  and  $m$  is not more than 4; and  
each X is a halogen.
17. (Previously presented) The process of claim 1, wherein the one or more Lewis acid(s) is represented by the formula  $M(RC=OO)_nR'_mX_{4-(m+n)}$ ;  
wherein M is Group 4, 5, or 14 metal;  
each  $RC=OO$  is a monovalent  $C_2$  to  $C_{30}$  hydrocarbacyl radical independently selected from the group consisting of an alkacyloxy, arylacyloxy, arylalkylacyloxy, alkylarylacyloxy radicals;  
each R' is a monovalent  $C_1$  to  $C_{12}$  hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;  
 $n$  is an integer from 0 to 4;  
 $m$  is an integer from 0 to 4, wherein the sum of  $n$  and  $m$  is not more than 4; and  
each X is a halogen.

2003B133  
Office Action of 6/8/06  
Response dated 10/6/06

18. (Previously presented) The process of claim 1, wherein the one or more Lewis acid(s) is represented by the formula  $\text{MOX}_3$ ;  
wherein M is a Group 5 metal; and  
each X is a halogen.
19. (Previously presented) The process of claim 1, wherein the one or more Lewis acid(s) is represented by the formula  $\text{MX}_3$ ;  
wherein M is a Group 13 metal; and  
each X is a halogen.
20. (Previously presented) The process of claim 1, wherein the one or more Lewis acid(s) is represented by the formula  $\text{MR}_n\text{X}_{3-n}$ ;  
wherein M is a Group 13 metal;  
each R is a monovalent  $\text{C}_1$  to  $\text{C}_{12}$  hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;  
 $n$  is an integer from 1 to 3; and  
each X is a halogen.
21. (Previously presented) The process of claim 1, wherein the one or more Lewis acid(s) is represented by the formula  $\text{M}(\text{RO})_n\text{R}'_m\text{X}_{3-(m+n)}$ ;  
wherein M is a Group 13 metal;  
each RO is a monovalent  $\text{C}_1$  to  $\text{C}_{30}$  hydrocarboxy radical independently selected from the group consisting of an alkoxy, aryloxy, arylalkoxy, alkylaryloxy radicals;  
each R' is a monovalent  $\text{C}_1$  to  $\text{C}_{12}$  hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;  
 $n$  is an integer from 0 to 3;  
 $m$  is an integer from 0 to 3, wherein the sum of  $n$  and  $m$  is from 1 to 3; and  
each X is a halogen.
22. (Previously presented) The process of claim 1, wherein the one or more Lewis acid(s) is represented by the formula  $\text{M}(\text{RC}=\text{OO})_n\text{R}'_m\text{X}_{3-(m+n)}$ ;  
wherein M is a Group 13 metal;

2003B133

Office Action of 6/8/06

Response dated 10/6/06

each  $RC=OO$  is a monovalent hydrocarbacyl radical independently selected from the group independently selected from the  $C_2$  to  $C_{30}$  group consisting of an alkacyloxy, arylacyloxy, arylalkylacyloxy, alkylarylacyloxy radicals;

each  $R'$  is a monovalent  $C_1$  to  $C_{12}$  hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;

$n$  is an integer from 0 to 3;

$m$  is a integer from 0 to 3, wherein the sum of  $n$  and  $m$  is from 1 to 3; and

each  $X$  is a halogen.

23. (Currently amended) A polymerization process comprising contacting one or more isoolefins, one or more Lewis acid(s), one or more initiator(s), and a diluent comprising one or more hydrofluorocarbon(s) (HFC's) in a reactor. The process of claim 1, wherein the one or more Lewis acid(s) is represented by the formula  $MX_y$ , wherein  $M$  is a Group 15 metal; each  $X$  is a halogen; and  $y$  is 3, 4 or 5.
24. (Currently amended) A polymerization process comprising contacting one or more isoolefins, one or more Lewis acid(s), one or more initiator(s), and a diluent comprising one or more hydrofluorocarbon(s) (HFC's) in a reactor. —The process of claim 1, wherein the one or more Lewis acid(s) is represented by the formula:  
 $MR_nX_{y-n}$ ;  
 wherein  $M$  is a Group 15 metal;  
 each  $R$  is a monovalent  $C_1$  to  $C_{12}$  hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;  
 $n$  is an integer from 0 to 4;  
 $y$  is 3, 4 or 5, wherein  $n$  is less than  $y$ ; wherein the sum of  $n$  and  $m$  is less than  $y$   
 each  $X$  is a halogen.
25. (Currently amended) A polymerization process comprising contacting one or more isoolefins, one or more Lewis acid(s), one or more initiator(s), and a diluent comprising one or more hydrofluorocarbon(s) (HFC's) in a reactor. The process of

2003B133

Office Action of 6/8/06

Response dated 10/6/06

~~claim 1~~, wherein the one or more Lewis acid(s) is represented by the formula  $M(RO)_nR'_mX_{y-(m+n)}$ ;

wherein M is a Group 15 metal,

each RO is a monovalent  $C_1$  to  $C_{30}$  hydrocarboxy radical independently selected from the group consisting of an alkoxy, aryloxy, arylalkoxy, alkylaryloxy radicals;

each R' is a monovalent  $C_1$  to  $C_{12}$  hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;

$n$  is an integer from 0 to 4;

$m$  is an integer from 0 to 4;

$y$  is 3, 4 or 5, wherein the sum of  $n$  and  $m$  is less than  $y$ ; and

each X is a halogen.

26. (Currently amended) A polymerization process comprising contacting one or more isoolefins, one or more Lewis acid(s), one or more initiator(s), and a diluent comprising one or more hydrofluorocarbon(s) (HFC's) in a reactor. The process of

~~claim 1~~, wherein the one or more Lewis acid(s) is represented by the formula  $M(RC=OO)_nR'_mX_{y-(m+n)}$ ;

wherein M is a Group 15 metal;

each  $RC=OO$  is a monovalent  $C_2$  to  $C_{30}$  hydrocarbacyloxy radical independently selected from the group consisting of an alkacyloxy, arylacyloxy, arylalkylacyloxy, alkylarylacyloxy radicals;

each R' is a monovalent  $C_1$  to  $C_{12}$  hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;

$n$  is an integer from 0 to 4;

$m$  is an integer from 0 to 4;

$y$  is 3, 4 or 5, wherein the sum of  $n$  and  $m$  is less than  $y$ ; and

each X is a halogen.

27. (Previously presented) The process of claim 1, wherein the one or more Lewis acid(s) is independently selected from the group consisting of titanium tetrachloride, titanium tetrabromide, vanadium tetrachloride, tin tetrachloride, zirconium tetrachloride, titanium bromide trichloride, titanium dibromide dichloride, vanadium bromide trichloride, tin chloride trifluoride, benzyltitanium trichloride, dibenzyltitanium



2003B133  
Office Action of 6/8/06  
Response dated 10/6/06

dichloride, benzylzirconium trichloride, dibenzylzirconium dibromide, methyltitanium trichloride, dimethyltitanium difluoride, dimethyltin dichloride, phenylvanadium trichloride, methoxytitanium trichloride, n-butoxytitanium trichloride, di(isopropoxy)titanium dichloride, phenoxytitanium tribromide, phenylmethoxyzirconium trifluoride, methyl methoxytitanium dichloride, methyl methoxytin dichloride, benzyl isopropoxyvanadium dichloride, acetoxytitanium trichloride, benzoylzirconium tribromide, benzoyloxytitanium trifluoride, isopropoxytin trichloride, methyl acetoxytitanium dichloride, benzyl benzoyloxyvanadium chloride, vanadium oxytrichloride, aluminum trichloride, boron trifluoride, gallium trichloride, indium trifluoride, ethylaluminum dichloride, methylaluminum dichloride, benzylaluminum dichloride, isobutylgallium dichloride, diethylaluminum chloride, dimethylaluminum chloride, ethylaluminum sesquichloride, methylaluminum sesquichloride, trimethylaluminum, triethylaluminum, methoxyaluminum dichloride, ethoxyaluminum dichloride, 2,6-di-tert-butylphenoxyaluminum dichloride, methoxy methylaluminum chloride, 2,6-di-tert-butylphenoxy methylaluminum chloride, isopropoxygallium dichloride, phenoxy methylindium fluoride, acetoxaluminum dichloride, benzoyloxyaluminum dibromide, benzoyloxygallium difluoride, methyl acetoxaluminum chloride, isopropoxyindium trichloride, antimony hexachloride, antimony hexafluoride, arsenic pentafluoride, antimony chloride pentafluoride, arsenic trifluoride, bismuth trichloride arsenic fluoride tetrachloride, tetraphenylantimony chloride, triphenylantimony dichloride, tetrachloromethoxyantimony, dimethoxytrichloroantimony, dichloromethoxyarsine, chlorodimethoxyarsine, difluoromethoxyarsine, acetatotetrachloroantimony, (benzoato) tetrachloroantimony, and bismuth acetate chloride.

28. (Previously presented) The process of claim 1, wherein the one or more Lewis acid(s) is independently selected from the group consisting of aluminum trichloride, aluminum tribromide, ethylaluminum dichloride, ethylaluminum sesquichloride, diethylaluminum chloride, methylaluminum dichloride, methylaluminum sesquichloride, dimethylaluminum chloride, boron trifluoride, and titanium tetrachloride.

2003B133

Office Action of 6/8/06

Response dated 10/6/06

29. (Previously presented) The process of claim 1, wherein the one or more initiator(s) comprise a hydrogen halide, a carboxylic acid, a carboxylic acid halide, a sulfonic acid, an alcohol, a phenol, a polymeric halide, a tertiary alkyl halide, a tertiary aralkyl halide, a tertiary alkyl ester, a tertiary aralkyl ester, a tertiary alkyl ether, a tertiary aralkyl ether, an alkyl halide, an aryl halide, an alkylaryl halide or an arylalkylacid halide.
30. (Currently amended) A polymerization process comprising contacting one or more isoolefins, one or more Lewis acid(s), one or more initiator(s), and a diluent comprising one or more hydrofluorocarbon(s) (HFC's) in a reactor. ~~The process of claim 1,~~ wherein the one or more initiator(s) is independently selected from the group consisting of HCl, H<sub>2</sub>O, methanol, (CH<sub>3</sub>)<sub>3</sub>CCl, C<sub>6</sub>H<sub>5</sub>C(CH<sub>3</sub>)<sub>2</sub>Cl, (2-Chloro-2,4,4-trimethylpentane) and 2-chloro-2-methylpropane.
31. (Currently amended) A polymerization process comprising contacting one or more isoolefins, one or more Lewis acid(s), one or more initiator(s), and a diluent comprising one or more hydrofluorocarbon(s) (HFC's) in a reactor. ~~The process of claim 1,~~ wherein the one or more initiator(s) is independently selected from the group consisting of hydrogen chloride, hydrogen bromide, hydrogen iodide, acetic acid, propanoic acid, butanoic acid; cinnamic acid, benzoic acid, 1-chloroacetic acid, dichloroacetic acid, trichloroacetic acid, trifluoroacetic acid, p-chlorobenzoic acid, p-fluorobenzoic acid, acetyl chloride, acetyl bromide, cinnamyl chloride, benzoyl chloride, benzoyl bromide, trichloroacetylchloride, trifluoroacetylchloride, p-fluorobenzoylchloride, methanesulfonic acid, trifluoromethanesulfonic acid, trichloromethanesulfonic acid, p-toluenesulfonic acid, methanesulfonyl chloride, methanesulfonyl bromide, trichloromethanesulfonyl chloride, trifluoromethanesulfonyl chloride, p-toluenesulfonyl chloride, methanol, ethanol, propanol, 2-propanol, 2-methylpropan-2-ol, cyclohexanol, benzyl alcohol, phenol, 2-methylphenol, 2,6-dimethylphenol, p-chlorophenol, p-fluorophenol, 2,3,4,5,6-pentafluorophenol, and 2-hydroxynaphthalene.
32. (Currently amended) A polymerization process comprising contacting one or more isoolefins, one or more Lewis acid(s), one or more initiator(s), and a diluent

2003B133  
Office Action of 6/8/06  
Response dated 10/6/06

comprising one or more hydrofluorocarbon(s) (HFC's) in a reactor. The process of  
~~claim 1~~, wherein the one or more initiator(s) is independently selected from the group  
consisting of 2-chloro-2,4,4-trimethylpentane; 2-bromo-2,4,4-trimethylpentane; 2-  
chloro-2-methylpropane; 2-bromo-2-methylpropane; 2-chloro-2,4,4,6,6-  
pentamethylheptane; 2-bromo-2,4,4,6,6-pentamethylheptane; 1-chloro-1-  
methylethylbenzene; 1-chloroadamantane; 1-chloroethylbenzene; 1,4-bis(1-chloro-1-  
methylethyl) benzene; 5-tert-butyl-1,3-bis(1-chloro-1-methylethyl) benzene; 2-  
acetoxy-2,4,4-trimethylpentane; 2-benzoyloxy-2,4,4-trimethylpentane; 2-acetoxy-2-  
methylpropane; 2-benzoyloxy-2-methylpropane; 2-acetoxy-2,4,4,6,6-  
pentamethylheptane; 2-benzoyl-2,4,4,6,6-pentamethylheptane; 1-acetoxy-1-  
methylethylbenzene; 1-acetoxyladamantane; 1-benzoyloxyethylbenzene; 1,4-bis(1-  
acetoxy-1-methylethyl) benzene; 5-tert-butyl-1,3-bis(1-acetoxy-1-methylethyl)  
benzene; 2-methoxy-2,4,4-trimethylpentane; 2-isopropoxy-2,4,4-trimethylpentane; 2-  
methoxy-2-methylpropane; 2-benzoyloxy-2-methylpropane; 2-methoxy-2,4,4,6,6-  
pentamethylheptane; 2-isopropoxy-2,4,4,6,6-pentamethylheptane; 1-methoxy-1-  
methylethylbenzene; 1-methoxyadamantane; 1-methoxyethylbenzene; 1,4-bis(1-  
methoxy-1-methylethyl) benzene; 5-tert-butyl-1,3-bis(1-methoxy-1-methylethyl)  
benzene, and 1,3,5-tris(1-chloro-1-methylethyl) benzene.

33. (Currently amended) A polymerization process comprising contacting one or more isoolefins, one or more Lewis acid(s), one or more initiator(s), and a diluent comprising one or more hydrofluorocarbon(s) (HFC's) in a reactor. The process of  
~~claim 1~~, wherein the one or more initiator(s) further comprise a weakly-coordinating anion.
34. (Previously presented) The process of claim 1, wherein the process is substantially absent of water.
35. (Currently amended) A polymerization process comprising contacting one or more isoolefins, one or more Lewis acid(s), one or more initiator(s), and a diluent comprising one or more hydrofluorocarbon(s) (HFC's) in a reactor. The process of  
~~claim 1~~, wherein the one or more initiator(s) comprise greater than 30 ppm water (based upon weight).

2003B133

Office Action of 6/8/06

Response dated 10/6/06

36. (Previously presented) The process of claim 1, wherein the one or more monomer(s) is independently selected from the group consisting of olefins, alpha-olefins, disubstituted olefins, isoolefins, conjugated dienes, non-conjugated dienes, styrenics, substituted styrenics, and vinyl ethers.
37. (Currently amended) The process of claim 1 36, wherein the one or more monomer(s) is independently selected from the group consisting of styrene, para-alkylstyrene, para-methylstyrene, alpha-methyl styrene, divinylbenzene, diisopropenylbenzene, isobutylene, 2-methyl-1-butene, 3-methyl-1-butene, 2-methyl-2-pentene, isoprene, butadiene, 2,3-dimethyl-1,3-butadiene,  $\beta$ -pinene, myrcene, 6,6-dimethyl-fulvene, hexadiene, cyclopentadiene, methyl cyclopentadiene, piperylene, methyl vinyl ether, ethyl vinyl ether, and isobutyl vinyl ether.
38. (Previously presented) The process of claim 1, wherein the reactor is independently selected from the group consisting of a continuous flow stirred tank reactor, a plug flow reactor, a moving belt or drum reactor, a jet or nozzle reactor, a tubular reactor, a batch reactor, and an autorefrigerated boiling-pool reactor.
39. (Previously presented) The polymerization process of claim 1, wherein the diluent has a dielectric constant greater than 10 at  $-85^{\circ}\text{C}$ .
40. (Original) The process of claim 39, wherein the dielectric constant is greater than 20 at  $-85^{\circ}\text{C}$ .
41. (Original) The process of claim 40, wherein the dielectric constant is greater than 25 at  $-85^{\circ}\text{C}$ .
42. (Currently amended) A polymerization process comprising contacting one or more isoolefins, one or more Lewis acid(s), one or more initiator(s), and a diluent comprising one or more hydrofluorocarbon(s) (HFC's) in a reactor. The process of claim 41, wherein the diluent has a dielectric constant is greater than 40 at  $-85^{\circ}\text{C}$ .

2003B133  
Office Action of 6/8/06  
Response dated 10/6/06

43. (Previously presented) The polymerization process of claim 1, wherein polymerization process forms a polymer having a diluent mass uptake of less than 4 wt%.
44. (Original) The process of claim 43, wherein the polymer has a diluent mass uptake of less than 3 wt%.
45. (Original) The process of claim 44, wherein the polymer has a diluent mass uptake of less than 2 wt%.
46. (Original) The process of claim 45, wherein the polymer has a diluent mass uptake of less than 1 wt%.
47. (Original) The process of claim 46, wherein the polymer has a diluent mass uptake of less than 0.5 wt%.
48. (Previously presented) The polymerization process of claim 1, the diluent comprising methyl chloride and one or more hydrofluorocarbon(s) independently selected from the group consisting of difluoromethane, 1,1-difluoroethane, and 1,1,1,2-tetrafluoroethane.
49. (Original) The process of claim 48 wherein the diluent further comprises a non-reactive olefin, one or more other hydrocarbons, and/or an inert gas.
50. (Previously presented) The polymerization process of claim 1, the process comprising the steps of:  
reacting the one or more monomer(s) in the presence of one or more Lewis acid(s), one or more initiator(s), and a diluent comprising one or more hydrofluorocarbon(s) (HFC's); and  
withdrawing the polymer from the reactor.
51. (Previously presented) The polymerization process of claim 1, the process comprising the steps of:

2003B133

Office Action of 6/8/06

Response dated 10/6/06

- (a) introducing one or more monomer(s) into a reactor;
  - (b) adding one or more Lewis acid(s) and one or more initiator(s);
  - (c) introducing a diluent comprising one or more hydrofluorocarbon(s) (HFC's);  
and
  - (d) withdrawing a polymer from the reactor.
52. (Previously presented) The polymerization process of claim 1 in which particles of polymer are ~~polymerized~~ produced using a catalyst system and a diluent comprising one or more hydrofluorocarbon(s) (HFC's).
53. (Previously presented) The polymerization process of claim 1 in which particles of polymer are ~~polymerized~~ produced in a slurry using a carbocationic catalyst system and a diluent comprising one or more hydrofluorocarbon(s) (HFC's).
54. (Previously presented) The polymerization process of claim 1 in which particles of polymer are ~~polymerized~~ produced using a catalyst system and a diluent, the diluent having a dielectric constant greater than 18.50 at -85°C.
55. (Original) The process of claim 54, wherein the dielectric constant is greater than 19.00 at -85°C.
56. (Original) The process of claim 55, wherein the dielectric constant is greater than 20.00 at -85°C.
57. (Original) The process of claim 56, wherein the dielectric constant is greater than 25.00 at -85°C.
58. (Original) The process of claim 57, wherein the dielectric constant is greater than 30.00 at -85°C.
59. (Original) The process of claim 58, wherein the dielectric constant is greater than 35.00 at -85°C.

2003B133

Office Action of 6/8/06

Response dated 10/6/06

60. (Currently amended) ~~The process of claim 59, wherein the dielectric constant is greater than 40.00 at -85°C. A polymerization process comprising contacting one or more isoolefins, one or more Lewis acid(s), one or more initiator(s), and a diluent comprising one or more hydrofluorocarbon(s) (HFC's) in a reactor, in which particles of polymer are produced using a catalyst system and a diluent, the diluent having a dielectric constant greater than 40.00 at -85°C.~~
61. (Previously presented) The process of claim 1, wherein the diluent is independently selected from the group consisting of at least one of a hydrofluorocarbon or a blend of a hydrofluorocarbon and methyl chloride.
62. (Original) A polymerization process in which particles of polymer are polymerized produced using a diluent comprising one or more hydrofluorocarbon(s) (HFC's).
63. (Cancelled)
64. (Original) A polymerization medium suitable to polymerize one or more monomer(s) to form a polymer, the polymerization medium comprising one or more Lewis acid(s), one or more initiator(s), and a diluent comprising one or more hydrofluorocarbon(s) (HFC's).
65. (Cancelled)
66. (Cancelled)
67. (Cancelled)
68. (Cancelled)
69. (Cancelled)
70. (New) The polymerization process of claim 1, wherein the diluent has a dielectric constant greater than 40 at -85°C.

2003B133

Office Action of 6/8/06

Response dated 10/6/06

71. (New) A polymerization process comprising contacting one or more monomers comprising isoolefin(s), one or more Lewis acid(s), one or more initiator(s), and a diluent comprising one or more hydrofluorocarbon(s) (HFC's) in a reactor.
72. (New) The process of claim 71, wherein one or more hydrofluorocarbon(s) is represented by the formula:  $C_xH_yF_z$  wherein x is an integer from 1 to 40 and y and z are integers of one or more.
73. (New) The process of claim 72, wherein x is from 1 to 10.
74. (New) The process of claim 72, wherein x is from 1 to 6.
75. (New) The process of claim 72, wherein x is from 1 to 3.
76. (New) The process of claim 71, wherein the one or more hydrofluorocarbon(s) is independently selected from the group consisting of fluoromethane; difluoromethane; trifluoromethane; fluoroethane; 1,1-difluoroethane; 1,2-difluoroethane; 1,1,1-trifluoroethane; 1,1,2-trifluoroethane; 1,1,1,2-tetrafluoroethane; 1,1,2,2-tetrafluoroethane; 1,1,1,2,2-pentafluoroethane; 1-fluoropropane; 2-fluoropropane; 1,1-difluoropropane; 1,2-difluoropropane; 1,3-difluoropropane; 2,2-difluoropropane; 1,1,1-trifluoropropane; 1,1,2-trifluoropropane; 1,1,3-trifluoropropane; 1,2,2-trifluoropropane; 1,2,3-trifluoropropane; 1,1,1,2-tetrafluoropropane; 1,1,1,3-tetrafluoropropane; 1,1,2,2-tetrafluoropropane; 1,1,2,3-tetrafluoropropane; 1,1,3,3-tetrafluoropropane; 1,2,2,3-tetrafluoropropane; 1,1,1,2,2-pentafluoropropane; 1,1,1,2,3-pentafluoropropane; 1,1,1,3,3-pentafluoropropane; 1,1,2,2,3-pentafluoropropane; 1,1,2,3,3-pentafluoropropane; 1,1,1,2,2,3-hexafluoropropane; 1,1,1,2,3,3-hexafluoropropane; 1,1,1,3,3,3-hexafluoropropane; 1,1,1,2,2,3,3-heptafluoropropane; 1,1,1,2,3,3,3-heptafluoropropane; 1-fluorobutane; 2-fluorobutane; 1,1-difluorobutane; 1,2-difluorobutane; 1,3-difluorobutane; 1,4-difluorobutane; 2,2-difluorobutane; 2,3-difluorobutane; 1,1,1-trifluorobutane; 1,1,2-trifluorobutane; 1,1,3-trifluorobutane; 1,1,4-trifluorobutane; 1,2,2-trifluorobutane; 1,2,3-trifluorobutane; 1,3,3-trifluorobutane; 2,2,3-trifluorobutane; 1,1,1,2-

Page 18 of 32

K:\BFC\LAW\Prosecution\BMCC Prosecution\2003\2003B133\US\2003B133-US Andr. Response 6 Oct 2006.doc



tetrafluorobutane; 1,1,1,3-tetrafluorobutane; 1,1,1,4-tetrafluorobutane; 1,1,2,2-tetrafluorobutane; 1,1,2,3-tetrafluorobutane; 1,1,2,4-tetrafluorobutane; 1,1,3,3-tetrafluorobutane; 1,1,3,4-tetrafluorobutane; 1,1,4,4-tetrafluorobutane; 1,2,2,3-tetrafluorobutane; 1,2,2,4-tetrafluorobutane; 1,2,3,3-tetrafluorobutane; 1,2,3,4-tetrafluorobutane; 2,2,3,3-tetrafluorobutane; 1,1,1,2,2-pentafluorobutane; 1,1,1,2,3-pentafluorobutane; 1,1,1,2,4-pentafluorobutane; 1,1,1,3,3-pentafluorobutane; 1,1,1,3,4-pentafluorobutane; 1,1,1,4,4-pentafluorobutane; 1,1,2,2,3-pentafluorobutane; 1,1,2,2,4-pentafluorobutane; 1,1,2,3,3-pentafluorobutane; 1,1,2,3,4-pentafluorobutane; 1,1,2,4,4-pentafluorobutane; 1,1,3,3,4-pentafluorobutane; 1,2,2,3,3-pentafluorobutane; 1,2,2,3,4-pentafluorobutane; 1,1,1,2,2,3-hexafluorobutane; 1,1,1,2,2,4-hexafluorobutane; 1,1,1,2,3,3-hexafluorobutane; 1,1,1,2,3,4-hexafluorobutane; 1,1,1,2,4,4-hexafluorobutane; 1,1,1,3,3,4-hexafluorobutane; 1,1,1,3,4,4-hexafluorobutane; 1,1,1,4,4,4-hexafluorobutane; 1,1,2,2,3,3-hexafluorobutane; 1,1,2,2,3,4-hexafluorobutane; 1,1,2,2,4,4-hexafluorobutane; 1,1,2,3,3,4-hexafluorobutane; 1,1,2,3,4,4-hexafluorobutane; 1,2,2,3,3,4-hexafluorobutane; 1,1,1,2,2,3,3-heptafluorobutane; 1,1,1,2,2,4,4-heptafluorobutane; 1,1,1,2,2,3,4-heptafluorobutane; 1,1,1,2,3,3,4-heptafluorobutane; 1,1,1,2,3,4,4-heptafluorobutane; 1,1,1,2,4,4,4-heptafluorobutane; 1,1,1,3,3,4,4-heptafluorobutane; 1,1,1,2,2,3,3,4-octafluorobutane; 1,1,1,2,2,3,4,4-octafluorobutane; 1,1,1,2,3,3,4,4-octafluorobutane; 1,1,1,2,2,4,4,4-octafluorobutane; 1,1,1,2,3,4,4,4-octafluorobutane; 1,1,1,2,2,3,3,4,4-nonafluorobutane; 1,1,1,2,2,3,4,4,4-nonafluorobutane; 1-fluoro-2-methylpropane; 1,1-difluoro-2-methylpropane; 1,3-difluoro-2-methylpropane; 1,1,1-trifluoro-2-methylpropane; 1,1,3-trifluoro-2-methylpropane; 1,3-difluoro-2-(fluoromethyl)propane; 1,1,1,3-tetrafluoro-2-methylpropane; 1,1,3,3-tetrafluoro-2-methylpropane; 1,1,3-trifluoro-2-(fluoromethyl)propane; 1,1,1,3,3-pentafluoro-2-methylpropane; 1,1,3,3-tetrafluoro-2-(fluoromethyl)propane; 1,1,1,3-tetrafluoro-2-(fluoromethyl)propane; fluorocyclobutane; 1,1-difluorocyclobutane; 1,2-difluorocyclobutane; 1,3-difluorocyclobutane; 1,1,2-trifluorocyclobutane; 1,1,3-trifluorocyclobutane; 1,2,3-trifluorocyclobutane; 1,1,2,2-tetrafluorocyclobutane; 1,1,3,3-tetrafluorocyclobutane; 1,1,2,2,3-pentafluorocyclobutane; 1,1,2,3,3-pentafluorocyclobutane; 1,1,2,2,3,3-hexafluorocyclobutane; 1,1,2,2,3,4-hexafluorocyclobutane; 1,1,2,3,3,4-hexafluorocyclobutane; 1,1,2,2,3,3,4-heptafluorocyclobutane; vinyl fluoride; 1,1-difluoroethene; 1,2-difluoroethene; 1,1,2-

2003B133  
Office Action of 6/8/06  
Response dated 10/6/06

trifluoroethene; 1-fluoropropene, 1,1-difluoropropene; 1,2-difluoropropene; 1,3-difluoropropene; 2,3-difluoropropene; 3,3-difluoropropene; 1,1,2-trifluoropropene; 1,1,3-trifluoropropene; 1,2,3-trifluoropropene; 1,3,3-trifluoropropene; 2,3,3-trifluoropropene; 3,3,3-trifluoropropene; 1-fluoro-1-butene; 2-fluoro-1-butene; 3-fluoro-1-butene; 4-fluoro-1-butene; 1,1-difluoro-1-butene; 1,2-difluoro-1-butene; 1,3-difluoropropene; 1,4-difluoro-1-butene; 2,3-difluoro-1-butene; 2,4-difluoro-1-butene; 3,3-difluoro-1-butene; 3,4-difluoro-1-butene; 4,4-difluoro-1-butene; 1,1,2-trifluoro-1-butene; 1,1,3-trifluoro-1-butene; 1,1,4-trifluoro-1-butene; 1,2,3-trifluoro-1-butene; 1,2,4-trifluoro-1-butene; 1,3,3-trifluoro-1-butene; 1,3,4-trifluoro-1-butene; 1,4,4-trifluoro-1-butene; 2,3,3-trifluoro-1-butene; 2,3,4-trifluoro-1-butene; 2,4,4-trifluoro-1-butene; 3,3,4-trifluoro-1-butene; 3,4,4-trifluoro-1-butene; 4,4,4-trifluoro-1-butene; 1,1,2,3-tetrafluoro-1-butene; 1,1,2,4-tetrafluoro-1-butene; 1,1,3,3-tetrafluoro-1-butene; 1,1,3,4-tetrafluoro-1-butene; 1,1,4,4-tetrafluoro-1-butene; 1,2,3,3-tetrafluoro-1-butene; 1,2,3,4-tetrafluoro-1-butene; 1,2,4,4-tetrafluoro-1-butene; 1,3,3,4-tetrafluoro-1-butene; 1,3,4,4-tetrafluoro-1-butene; 1,4,4,4-tetrafluoro-1-butene; 2,3,3,4-tetrafluoro-1-butene; 2,3,4,4-tetrafluoro-1-butene; 2,4,4,4-tetrafluoro-1-butene; 3,3,4,4-tetrafluoro-1-butene; 3,4,4,4-tetrafluoro-1-butene; 1,1,2,3,3-pentafluoro-1-butene; 1,1,2,3,4-pentafluoro-1-butene; 1,1,2,4,4-pentafluoro-1-butene; 1,1,3,3,4-pentafluoro-1-butene; 1,1,3,4,4-pentafluoro-1-butene; 1,1,4,4,4-pentafluoro-1-butene; 1,2,3,3,4-pentafluoro-1-butene; 1,2,3,4,4-pentafluoro-1-butene; 1,2,4,4,4-pentafluoro-1-butene; 2,3,3,4,4-pentafluoro-1-butene; 2,3,4,4,4-pentafluoro-1-butene; 3,3,4,4,4-pentafluoro-1-butene; 1,1,2,3,3,4-hexafluoro-1-butene; 1,1,2,3,4,4-hexafluoro-1-butene; 1,1,2,4,4,4-hexafluoro-1-butene; 1,2,3,3,4,4-hexafluoro-1-butene; 1,2,3,4,4,4-hexafluoro-1-butene; 2,3,3,4,4,4-hexafluoro-1-butene; 1,1,2,3,3,4,4-heptafluoro-1-butene; 1,1,2,3,4,4,4-heptafluoro-1-butene; 1,1,3,3,4,4,4-heptafluoro-1-butene; 1,2,3,3,4,4,4-heptafluoro-1-butene; 1-fluoro-2-butene; 2-fluoro-2-butene; 1,1-difluoro-2-butene; 1,2-difluoro-2-butene; 1,3-difluoro-2-butene; 1,4-difluoro-2-butene; 2,3-difluoro-2-butene; 1,1,1-trifluoro-2-butene; 1,1,2-trifluoro-2-butene; 1,1,3-trifluoro-2-butene; 1,1,4-trifluoro-2-butene; 1,2,3-trifluoro-2-butene; 1,2,4-trifluoro-2-butene; 1,1,1,2-tetrafluoro-2-butene; 1,1,1,3-tetrafluoro-2-butene; 1,1,1,4-tetrafluoro-2-butene; 1,1,2,3-tetrafluoro-2-butene; 1,1,2,4-tetrafluoro-2-butene; 1,2,3,4-tetrafluoro-2-butene; 1,1,1,2,3-pentafluoro-2-butene; 1,1,1,2,4-pentafluoro-2-butene; 1,1,1,3,4-pentafluoro-2-butene; 1,1,1,4,4-pentafluoro-2-butene;

2003B133  
Office Action of 6/8/06  
Response dated 10/6/06

1,1,2,3,4-pentafluoro-2-butene; 1,1,2,4,4-pentafluoro-2-butene; 1,1,1,2,3,4-hexafluoro-2-butene; 1,1,1,2,4,4-hexafluoro-2-butene; 1,1,1,3,4,4-hexafluoro-2-butene; 1,1,1,4,4,4-hexafluoro-2-butene; 1,1,2,3,4,4-hexafluoro-2-butene; 1,1,1,2,3,4,4-heptafluoro-2-butene; 1,1,1,2,4,4,4-heptafluoro-2-butene; and mixtures thereof.

77. (New) The process of claim 71, wherein the one or more hydrofluorocarbon(s) is independently selected from the group consisting of fluoromethane, difluoromethane, trifluoromethane, 1,1-difluoroethane, 1,1,1-trifluoroethane, 1,1,1,2-tetrafluoroethane, and mixtures thereof.
78. (New) The process of claim 71, wherein the diluent comprises from 15 to 100 volume % HFC based upon the total volume of the diluent.
79. (New) The process of claim 78, wherein the diluent comprises from 20 to 100 volume % HFC based upon the total volume of the diluent.
80. (New) The process of claim 79, wherein the diluent comprises from 25 to 100 volume % HFC based upon the total volume of the diluent.
81. (New) The process of claim 71, wherein the diluent further comprises a hydrocarbon, a non-reactive olefin, and/or an inert gas.
82. (New) The process of claim 71, wherein the diluent further comprises a halogenated hydrocarbon other than an HFC.
83. (New) The process of claim 71, wherein the diluent further comprises methyl chloride.
84. (New) The process of claim 71, wherein the one or more Lewis acid(s) is represented by the formula  $MX_4$ ;  
wherein M is a Group 4, 5, or 14 metal; and  
each X is a halogen.

2003B133

Office Action of 6/8/06

Response dated 10/6/06

85. (New) The process of claim 71, wherein the one or more Lewis acid(s) is represented by the formula  $MR_nX_{4-n}$ ;  
wherein M is Group 4, 5, or 14 metal;  
each R is a monovalent  $C_1$  to  $C_{12}$  hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;  
 $n$  is an integer from 0 to 4; and  
each X is a halogen.
86. (New) The process of claim 71, wherein the one or more Lewis acid(s) is represented by the formula  $M(RO)_nR'_mX_{4-(m+n)}$ ;  
wherein M is Group 4, 5, or 14 metal;  
each RO is a monovalent  $C_1$  to  $C_{30}$  hydrocarboxy radical independently selected from the group consisting of an alkoxy, aryloxy, arylalkoxy, alkylaryloxy radicals;  
each R' is a monovalent  $C_1$  to  $C_{12}$  hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;  
 $n$  is an integer from 0 to 4;  
 $m$  is an integer from 0 to 4, wherein the sum of  $n$  and  $m$  is not more than 4; and  
each X is a halogen.
87. (New) The process of claim 71, wherein the one or more Lewis acid(s) is represented by the formula  $M(RC=OO)_nR'_mX_{4-(m+n)}$ ;  
wherein M is Group 4, 5, or 14 metal;  
each  $RC=OO$  is a monovalent  $C_2$  to  $C_{30}$  hydrocarbacyl radical independently selected from the group consisting of an alkacyloxy, arylacyloxy, arylalkylacyloxy, alkylarylacyloxy radicals;  
each R' is a monovalent  $C_1$  to  $C_{12}$  hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;  
 $n$  is an integer from 0 to 4;  
 $m$  is an integer from 0 to 4, wherein the sum of  $n$  and  $m$  is not more than 4; and  
each X is a halogen.

2003B133

Office Action of 6/8/06

Response dated 10/6/06

88. (New) The process of claim 71, wherein the one or more Lewis acid(s) is represented by the formula  $MOX_3$ ;  
wherein M is a Group 5 metal; and  
each X is a halogen.
89. (New) The process of claim 71, wherein the one or more Lewis acid(s) is represented by the formula  $MX_3$ ;  
wherein M is a Group 13 metal; and  
each X is a halogen.
90. (New) The process of claim 71, wherein the one or more Lewis acid(s) is represented by the formula  $MR_nX_{3-n}$ ;  
wherein M is a Group 13 metal;  
each R is a monovalent  $C_1$  to  $C_{12}$  hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;  
 $n$  is an integer from 1 to 3; and  
each X is a halogen.
91. (New) The process of claim 71, wherein the one or more Lewis acid(s) is represented by the formula  $M(RO)_nR'_mX_{3-(m+n)}$ ;  
wherein M is a Group 13 metal;  
each RO is a monovalent  $C_1$  to  $C_{30}$  hydrocarboxy radical independently selected from the group consisting of an alkoxy, aryloxy, arylalkoxy, alkylaryloxy radicals;  
each R' is a monovalent  $C_1$  to  $C_{12}$  hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;  
 $n$  is an integer from 0 to 3;  
 $m$  is an integer from 0 to 3, wherein the sum of  $n$  and  $m$  is from 1 to 3; and  
each X is a halogen.
92. (New) The process of claim 71, wherein the one or more Lewis acid(s) is represented by the formula  $M(RC=OO)_nR'_mX_{3-(m+n)}$ ;  
wherein M is a Group 13 metal;

2003B133  
Office Action of 6/8/06  
Response dated 10/6/06

each  $\text{RC}=\text{OO}$  is a monovalent hydrocarbacyl radical independently selected from the group independently selected from the  $\text{C}_2$  to  $\text{C}_{30}$  group consisting of an alkacyloxy, arylacyloxy, arylalkylacyloxy, alkylarylacyloxy radicals;  
each  $\text{R}'$  is a monovalent  $\text{C}_1$  to  $\text{C}_{12}$  hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;  
 $n$  is an integer from 0 to 3;  
 $m$  is a integer from 0 to 3, wherein the sum of  $n$  and  $m$  is from 1 to 3; and  
each  $\text{X}$  is a halogen.

93. (New) The process of claim 71, wherein the one or more Lewis acid(s) is represented by the formula  $\text{MX}_y$ ,  
wherein  $\text{M}$  is a Group 15 metal;  
each  $\text{X}$  is a halogen; and  
 $y$  is 3, 4 or 5.

94. (New) The process of claim 71, wherein the one or more Lewis acid(s) is represented by the formula:  
 $\text{MR}_n\text{X}_{y-n}$ ;  
wherein  $\text{M}$  is a Group 15 metal;  
each  $\text{R}$  is a monovalent  $\text{C}_1$  to  $\text{C}_{12}$  hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;  
 $n$  is an integer from 0 to 4;  
 $y$  is 3, 4 or 5, wherein  $n$  is less than  $y$ ; wherein the sum of  $n$  and  $m$  is less than  $y$   
each  $\text{X}$  is a halogen.

95. (New) The process of claim 71, wherein the one or more Lewis acid(s) is represented by the formula  $\text{M}(\text{RO})_n\text{R}'_m\text{X}_{y-(m+n)}$ ;  
wherein  $\text{M}$  is a Group 15 metal,  
each  $\text{RO}$  is a monovalent  $\text{C}_1$  to  $\text{C}_{30}$  hydrocarboxy radical independently selected from the group consisting of an alkoxy, aryloxy, arylalkoxy, alkylaryloxy radicals;  
each  $\text{R}'$  is a monovalent  $\text{C}_1$  to  $\text{C}_{12}$  hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;  
 $n$  is an integer from 0 to 4;

2003B133

Office Action of 6/8/06

Response dated 10/6/06

$m$  is an integer from 0 to 4;

$y$  is 3, 4 or 5, wherein the sum of  $n$  and  $m$  is less than  $y$ ; and

each X is a halogen.

96. (New) The process of claim 71, wherein the one or more Lewis acid(s) is represented by the formula  $M(RC=OO)_nR'_mX_{y-(m+n)}$ ;

wherein M is a Group 15 metal;

each  $RC=OO$  is a monovalent  $C_2$  to  $C_{30}$  hydrocarbacyloxy radical independently selected from the group consisting of an alkacyloxy, arylacyloxy, arylalkylacyloxy, alkylarylacyloxy radicals;

each  $R'$  is a monovalent  $C_1$  to  $C_{12}$  hydrocarbon radical independently selected from the group consisting of an alkyl, aryl, arylalkyl, alkylaryl and cycloalkyl radicals;

$n$  is an integer from 0 to 4;

$m$  is an integer from 0 to 4;

$y$  is 3, 4 or 5, wherein the sum of  $n$  and  $m$  is less than  $y$ ; and

each X is a halogen.

97. (New) The process of claim 71, wherein the one or more Lewis acid(s) is independently selected from the group consisting of titanium tetrachloride, titanium tetrabromide, vanadium tetrachloride, tin tetrachloride, zirconium tetrachloride, titanium bromide trichloride, titanium dibromide dichloride, vanadium bromide trichloride, tin chloride trifluoride, benzyltitanium trichloride, dibenzyltitanium dichloride, benzylzirconium trichloride, dibenzylzirconium dibromide, methyltitanium trichloride, dimethyltitanium difluoride, dimethyltin dichloride, phenylvanadium trichloride, methoxytitanium trichloride, n-butoxytitanium trichloride, di(isopropoxy)titanium dichloride, phenoxytitanium tribromide, phenylmethoxyzirconium trifluoride, methyl methoxytitanium dichloride, methyl methoxytin dichloride, benzyl isopropoxyvanadium dichloride, acetoxytitanium trichloride, benzoylzirconium tribromide, benzoyloxytitanium trifluoride, isopropoyloxytin trichloride, methyl acetoxytitanium dichloride, benzyl benzoyloxyvanadium chloride, vanadium oxytrichloride, aluminum trichloride, boron trifluoride, gallium trichloride, indium trifluoride, ethylaluminum dichloride, methylaluminum dichloride, benzylaluminum dichloride, isobutylgallium dichloride,

Page 25 of 32

X:\BP\OLA\W\Prosecution\BMCC Prosecution\2003\2003B133\US2003B133-US Amdt Response 6 Oct 2006.doc

2003B133

Office Action of 6/8/06

Response dated 10/6/06

diethylaluminum chloride, dimethylaluminum chloride, ethylaluminum sesquichloride, methylaluminum sesquichloride, trimethylaluminum, triethylaluminum, methoxyaluminum dichloride, ethoxyaluminum dichloride, 2,6-di-tert-butylphenoxyaluminum dichloride, methoxy methylaluminum chloride, 2,6-di-tert-butylphenoxy methylaluminum chloride, isopropoxygallium dichloride, phenoxy methylindium fluoride, acetoxyaluminum dichloride, benzoyloxyaluminum dibromide, benzoyloxygallium difluoride, methyl acetoxyaluminum chloride, isopropoxyindium trichloride, antimony hexachloride, antimony hexafluoride, arsenic pentafluoride, antimony chloride pentafluoride, arsenic trifluoride, bismuth trichloride arsenic fluoride tetrachloride, tetraphenylantimony chloride, triphenylantimony dichloride, tetrachloromethoxyantimony, dimethoxytrichloroantimony, dichloromethoxyarsine, chlorodimethoxyarsine, difluoromethoxyarsine, acetatotetrachloroantimony, (benzoato) tetrachloroantimony, and bismuth acetate chloride.

98. (New) The process of claim 71, wherein the one or more Lewis acid(s) is independently selected from the group consisting of aluminum trichloride, aluminum tribromide, ethylaluminum dichloride, ethylaluminum sesquichloride, diethylaluminum chloride, methylaluminum dichloride, methylaluminum sesquichloride, dimethylaluminum chloride, boron trifluoride, and titanium tetrachloride.
99. (New) The process of claim 71, wherein the one or more initiator(s) comprise a hydrogen halide, a carboxylic acid, a carboxylic acid halide, a sulfonic acid, an alcohol, a phenol, a polymeric halide, a tertiary alkyl halide, a tertiary aralkyl halide, a tertiary alkyl ester, a tertiary aralkyl ester, a tertiary alkyl ether, a tertiary aralkyl ether, an alkyl halide, an aryl halide, an alkylaryl halide or an arylalkylacid halide.
100. (New) The process of claim 71, wherein the one or more initiator(s) is independently selected from the group consisting of HCl, H<sub>2</sub>O, methanol, (CH<sub>3</sub>)<sub>3</sub>CCl, C<sub>6</sub>H<sub>5</sub>C(CH<sub>3</sub>)<sub>2</sub>Cl, (2-Chloro-2,4,4-trimethylpentane) and 2-chloro-2-methylpropane.



2003B133  
Office Action of 6/8/06  
Response dated 10/6/06

101. (New) The process of claim 71, wherein the one or more initiator(s) is independently selected from the group consisting of hydrogen chloride, hydrogen bromide, hydrogen iodide, acetic acid, propanoic acid, butanoic acid; cinnamic acid, benzoic acid, 1-chloroacetic acid, dichloroacetic acid, trichloroacetic acid, trifluoroacetic acid, p-chlorobenzoic acid, p-fluorobenzoic acid, acetyl chloride, acetyl bromide, cinnamyl chloride, benzoyl chloride, benzoyl bromide, trichloroacetylchloride, trifluoroacetylchloride, p-fluorobenzoylchloride, methanesulfonic acid, trifluoromethanesulfonic acid, trichloromethanesulfonic acid, p-toluenesulfonic acid, methanesulfonyl chloride, methanesulfonyl bromide, trichloromethanesulfonyl chloride, trifluoromethanesulfonyl chloride, p-toluenesulfonyl chloride, methanol, ethanol, propanol, 2-propanol, 2-methylpropan-2-ol, cyclohexanol, benzyl alcohol, phenol, 2-methylphenol, 2,6-dimethylphenol, p-chlorophenol, p-fluorophenol, 2,3,4,5,6-pentafluorophenol, and 2-hydroxynaphthalene.
102. (New) The process of claim 71, wherein the one or more initiator(s) is independently selected from the group consisting of 2-chloro-2,4,4-trimethylpentane; 2-bromo-2,4,4-trimethylpentane; 2-chloro-2-methylpropane; 2-bromo-2-methylpropane; 2-chloro-2,4,4,6,6-pentamethylheptane; 2-bromo-2,4,4,6,6-pentamethylheptane; 1-chloro-1-methylethylbenzene; 1-chloroadamantane; 1-chloroethylbenzene; 1,4-bis(1-chloro-1-methylethyl) benzene; 5-tert-butyl-1,3-bis(1-chloro-1-methylethyl) benzene; 2-acetoxy-2,4,4-trimethylpentane; 2-benzoyloxy-2,4,4-trimethylpentane; 2-acetoxy-2-methylpropane; 2-benzoyloxy-2-methylpropane; 2-acetoxy-2,4,4,6,6-pentamethylheptane; 2-benzoyl-2,4,4,6,6-pentamethylheptane; 1-acetoxy-1-methylethylbenzene; 1-acetoxadamantane; 1-benzoyloxyethylbenzene; 1,4-bis(1-acetoxy-1-methylethyl) benzene; 5-tert-butyl-1,3-bis(1-acetoxy-1-methylethyl) benzene; 2-methoxy-2,4,4-trimethylpentane; 2-isopropoxy-2,4,4-trimethylpentane; 2-methoxy-2-methylpropane; 2-benzoyloxy-2-methylpropane; 2-methoxy-2,4,4,6,6-pentamethylheptane; 2-isopropoxy-2,4,4,6,6-pentamethylheptane; 1-methoxy-1-methylethylbenzene; 1-methoxyadamantane; 1-methoxyethylbenzene; 1,4-bis(1-methoxy-1-methylethyl) benzene; 5-tert-butyl-1,3-bis(1-methoxy-1-methylethyl) benzene, and 1,3,5-tris(1-chloro-1-methylethyl) benzene.

2003B133  
Office Action of 6/8/06  
Response dated 10/6/06

103. (New) The process of claim 71, wherein the one or more initiator(s) further comprise a weakly-coordinating anion.
104. (New) The process of claim 71, wherein the process is substantially absent of water.
105. (New) The process of claim 71, wherein the one or more initiator(s) comprise greater than 30 ppm water (based upon weight).
106. (New) The process of claim 1, wherein the one or more monomer(s) comprises isobutylene.
107. (New) The process of claim 71, wherein the one or more monomer(s) comprises isobutylene and para-alkylstyrene or isoprene.
108. (New) The process of claim 71, wherein the reactor is independently selected from the group consisting of a continuous flow stirred tank reactor, a plug flow reactor, a moving belt or drum reactor, a jet or nozzle reactor, a tubular reactor, a batch reactor, and an autorefrigerated boiling-pool reactor.
109. (New) The polymerization process of claim 71, wherein the diluent has a dielectric constant greater than 10 at -85°C.
110. (New) The polymerization process of claim 71, wherein polymerization process forms a polymer having a diluent mass uptake of less than 4 wt%.
111. (New) The polymerization process of claim 71, the diluent comprising methyl chloride and one or more hydrofluorocarbon(s) independently selected from the group consisting of difluoromethane, 1,1-difluoroethane, and 1,1,1,2-tetrafluoroethane.
112. (New) The process of claim 111 wherein the diluent further comprises a non-reactive olefin, one or more other hydrocarbons, and/or an inert gas.

2003B133  
Office Action of 6/8/06  
Response dated 10/6/06

113. (New) The process of claim 71, wherein the diluent is independently selected from the group consisting of at least one of a hydrofluorocarbon or a blend of a hydrofluorocarbon and methyl chloride.

**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☐ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☒ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**